

Two New Species of the Spider Genus *Diphya* (Araneae: Tetragnathidae) from Japan and Taiwan, with Notes on the Known Species

Akio TANIKAWA¹⁾

谷川明男¹⁾: ヒメドヨウグモ属クモ類 (アシナガグモ科) の
日本および台湾産 2 新種の記載と既知種の見直し

Abstract Two new species of the genus *Diphya* are described from Japan and Taiwan under the names *Diphya okumae* sp. nov. and *D. taiwanica* sp. nov. The genus is new to the Asian fauna. All the known species of the genus are reviewed. Two species of the genus recorded from Chile are newly synonymized: *D. pallida* TULLGREN, 1902 = *D. limbata* SIMON, 1896; *D. rugosa* TULLGREN, 1902 = *D. macrophthalma* NICOLET, 1849.

In the summer of 1985, I discovered a female of a strange orb-web spider at Marubi at the foot of Mt. Fuji. Then, I could find two female and one male specimens of the spider from Tokyo and Kanagawa in 1989 and 1990. However, the spider has never been collected since then. Recently, I learned that Dr. Chiyoiko OKUMA, Fukuoka, possesses many specimens of the same species collected in Kyushu and a female specimen of another congeneric species from Taiwan. I found one female specimen of the Taiwanese species in the collection of the National Science Museum (Nat. Hist), Tokyo. It was obtained during the zoological expedition to Taiwan made by the museum in 1991. After a careful examination based on these materials, I came to the conclusion that both the species belong to the genus *Diphya* and are new to science. They will be described in this paper.

Under the genus *Diphya*, eight species were described from South America, South Africa and Madagascar (BONNET, 1956; BRIGNOLI, 1983; PLATNICK, 1989), but no species was known from Asia. In order to study the Asian species, I reviewed all the known species. Two new synonymies recognized in the course of this study will be proposed in the present paper: *D. pallida* TULLGREN, 1902 is a junior synonym of *D. limbata* SIMON, 1896, and *D. rugosa* TULLGREN, 1902 is a junior synonym of *D. macrophthalma* NICOLET, 1849.

All the type specimens of the new species described in this paper are deposited in the collection of National Science Museum (Natural History), Tokyo.

Before going further, I wish to express my hearty thanks to Dr. Hirotugu ONO, National Science Museum (Natural History), Tokyo, for his constant guidance and

1) Shichirigahama Senior High School, 2-3-1, Shichirigahama-higashi, Kamakura-shi, Kanagawa, 248 Japan

神奈川県立七里ガ浜高等学校 〒248 神奈川県鎌倉市七里ガ浜東 2-3-1

Accepted October 30, 1995

revising the manuscript of this paper. I am deeply indebted to Dr. Torbjörn KRONESTEDT, Naturhistoriska Riksmuseet, Stockholm, Dr. Christine ROLLARD, Muséum National d'Histoire Naturelle, Paris, and Dr. Lennart CEDERHOLM, Museum of Zoology, Lund University, Sweden, for loaning invaluable specimens. My sincere thanks are also due to Dr. Chiyoko OKUMA, Fukuoka, Mr. Kiyoto OGATA, Aichi, and Mr. Koichi NOJIMA, Okayama, for their offering valuable specimens used in this study.

Following abbreviations are used in this paper: MNHN, Muséum National d'Histoire Naturelle, Paris; MZLU, Museum of Zoology, Lund University, Sweden; NRS, Naturhistoriska Riksmuseet, Stockholm; NSMT, National Science Museum (Natural History), Tokyo.

Genus *Diphya* NICOLET, 1849

Diphya NICOLET, 1849, p. 404. Type species: *Diphya macrophthalma* NICOLET, 1849.—SIMON, 1894, p. 742.—TULLGREN, 1902, p. 24.

Diagnosis. As SIMON (1894) mentioned, spiders of the genus *Diphya* NICOLET, 1849 seem to be related to those of the genus *Dolichognatha* O. PICKARD-CAMBRIDGE, 1869. However, the species of *Diphya* can be easily distinguished from those of *Dolichognatha* by the small sized anterior median eyes and by the condition of spines on the first and second legs.

Description. Carapace longer than wide. Anterior median eye much smaller than the other eyes; median ocular area longer than wide, much narrower in front than behind. Labium wider than long. First and second legs prolaterally with a row of spines. Male palp simple, tegulum spherical, cymbium with retrolateral projection. Abdomen oval.

Species. Including new species described in this paper eight species are known under the genus. Of these, four species are occurring in South America, one species in South Africa, one species in Madagascar, and two species in East Asia.

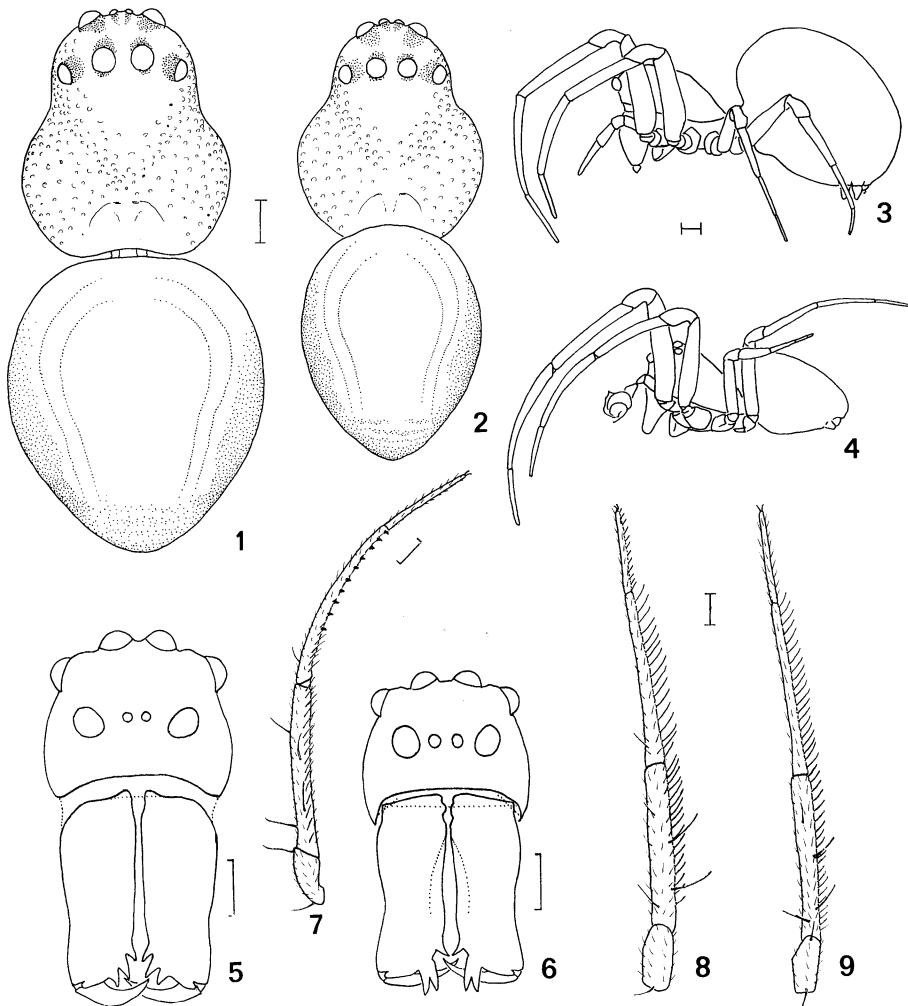
Descriptions of New Species

Diphya okumae sp. nov.

(Figs. 1–13)

Type series. Holotype: ♂, Allotype: ♀, Hachiôji-jôshi, Hachiôji-shi, Tokyo, 21-V-1989, A. TANIKAWA leg. (NSMT-Ar 3265–3266); Paratypes. 1♀, Fudakake, Aikô-gun, Kanagawa Pref., 17-VI-1990, (NSMT-Ar 3267); 1♀, Marubi, Fuji-shi, Shizuoka Pref., 2-VI-1985, A. TANIKAWA leg. (NSMT-Ar 3268); 1♀, Inabu-chô, Kitashidara-gun, Aichi Pref., 29-V-1994, K. OGATA leg. (NSMT-Ar 3269); 1♂1♀, 5-9-VI-1958, 1♀, 27-31-V-1959, Mt. Hikosan, Tagawa-gun, Fukuoka Pref., C. OKUMA leg. (NSMT-Ar 3270–3272).

Other specimens examined. 1♂, Mt. Togokusan, Nagoya-shi, Aichi Pref., 16-IV-1995, Y. OGASAWARA leg.; 3♀♀, Doi, Sakutô-chô, Okayama Pref., 3-VI-1989, K. NOJIMA leg.; 9♀♀, Mt. Hikosan, Tagawa-gun, Fukuoka Pref., 27-31-V-1959, C. OKUMA leg.



Figs. 1-9. *Diphya okumae* sp. nov. —1. Cephalothorax and abdomen of female, dorsal view (paratype, NSMT-Ar 3266). 2. Same parts of male (holotype, NSMT-Ar 3265). 3. Female, lateral view (paratype, NSMT-Ar 3267). 4. Male, lateral view (holotype, NSMT-Ar 3265). 5. Eye area and chelicerae of female, frontal view (paratype, NSMT-Ar 3266). 6. Same parts of male (holotype, NSMT-Ar 3265). 7. Left leg I of male, prolateral view (holotype, NSMT-Ar 3265). 8. Left leg I of female, dorsal view (paratype, NSMT-Ar 3267). 9. Left leg I of male, dorsal view (holotype, NSMT-Ar 3265). (Scales: 0.25 mm.)

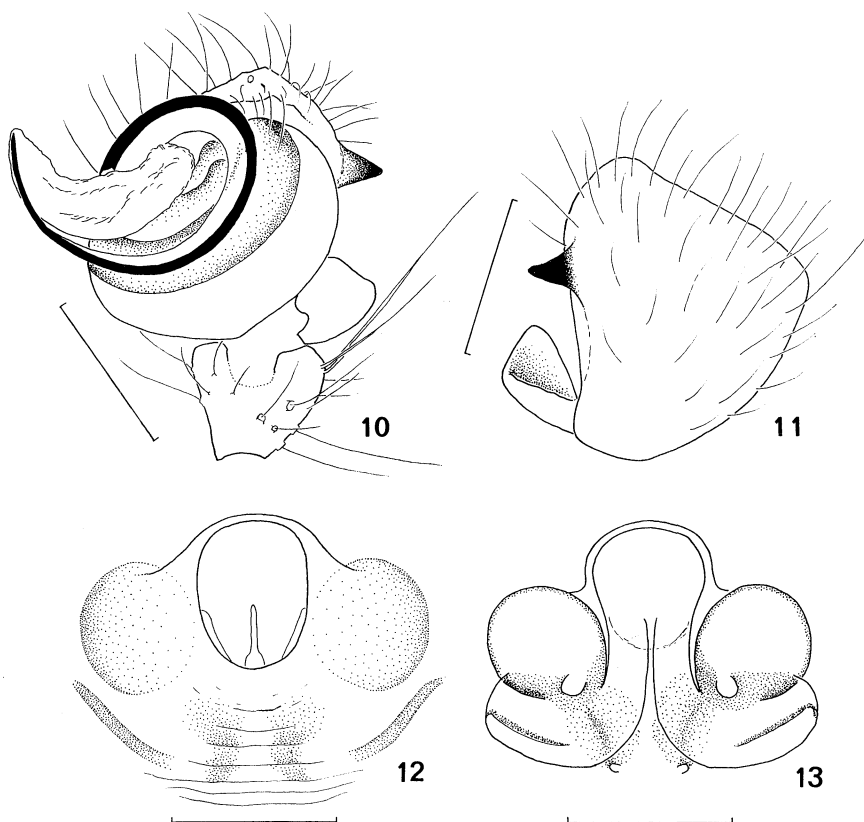
Description (based on the ♂ holotype and ♀ allotype; variations are given in the parentheses). Measurement (in mm). Total length ♂ 2.66 (2.33-2.66), ♀ 3.56 (3.10-4.10); carapace length ♂ 1.36 (1.33-1.36), ♀ 1.62 (1.51-1.75); width ♂ 1.16 (1.03-1.16), ♀ 1.28 (1.19-1.30); abdomen length ♂ 1.48 (1.16-1.48), ♀ 1.92 (1.53-2.35), width ♂ 1.10 (0.96-1.10), ♀ 1.58 (1.38-2.04). Length of legs of ♂

holotype and ♀ allotype as shown in Table 1.

Male. Carapace length/width 1.17 (1.17–1.29), with many punctations (Fig. 2); diameter of anterior median eye/that of anterior lateral eye 0.40 (0.40–0.50); median ocular area: length/width 1.37 (1.37–1.38), anterior width/posterior width 0.49 (0.49–0.50). Chelicera promarginally with 1 normal tooth and 1 large bifurcated tooth (Fig. 6), retromarginally with 2 (1–2) normal teeth and 1 large bifurcated tooth.

Table 1. Measurement of leg segments of *Diphya okumae* sp. nov. (in mm; ♂/♀).

Leg	Tarsus	Metatarsus	Tibia	Patella	Femur	Total
I	0.75/0.78	1.54/1.50	1.36/1.31	0.53/0.59	1.48/1.47	5.66/5.65
II	0.67/0.69	1.30/1.30	1.08/1.15	0.52/0.58	1.37/1.42	4.94/5.14
III	0.41/0.46	0.68/0.75	0.61/0.70	0.34/0.37	0.85/0.99	2.89/3.27
IV	0.47/0.52	0.93/1.03	0.84/0.95	0.35/0.41	1.13/1.36	3.72/4.27



Figs. 10–13. *Diphya okumae* sp. nov.—10. Male left palp, ventral view (holotype, NSMT–Ar 3265). 11. Male left palpal cymbium, dorsal view (holotype, NSMT–Ar 3265). 12. Epigynum (paratype, NSMT–Ar 3266). 13. Female genitalia, dorsal view (paratype, NSMT–Ar 3268). (Scales: 0.25 mm.)

Labium length/width 0.59 (0.53–0.59); sternum length/width 1.02. Metatarsi and tibiae of first and second legs prolaterally with a row of thin spines (Fig. 9), metatarsi of first and second legs ventrally with a row of short and thick spines (Fig. 7), length of leg I/carapace 4.16 (3.80–4.16). Male palp (Figs. 10–11): tegulum spherical, cymbium with a retrolateral projection. Abdomen length/width 1.35 (1.21–1.35).

Female. Carapace length/width 1.26 (1.25–1.38), with many punctations (Fig. 1); diameter of anterior median eye/that of anterior lateral eye 0.43 (0.42–0.43); median ocular area length/width 1.31 (1.31–1.38), anterior width/posterior width 0.44 (0.44–0.48). Chelicera with 3 promarginal (Fig. 5) and 3 (3–4) retromarginal teeth. Labium length/width 0.45 (0.43–0.53); sternum length/width 1.02 (1.02–1.10). Metatarsi and tibiae of first and second legs prolaterally with a row of thin spines (Fig. 8), length of leg I/carapace 3.49 (3.33–3.49). Abdomen length/width 1.22 (1.10–1.22). Female genitalia as shown in Figs. 12–13.

Coloration and markings. Male and female (Figs. 1–2): Carapace and legs orange. Abdomen pale brown, laterally darker, with white markings.

Range. Japan (Honshu, Kyushu).

Remarks. This new species is easily distinguished from the other species of the genus by the feature of epigynum and male palpal organ. The new species has no close relationship to the South American and the South African species.

Etymology. Named after Dr. Chiyoko OKUMA.

Diphya taiwanica sp. nov.

(Figs. 14–16)

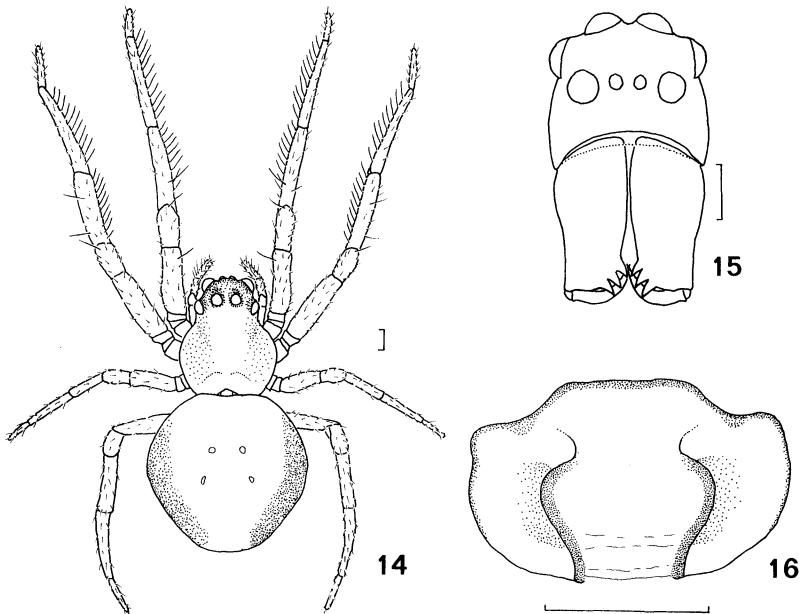
Type series. Holotype: ♀, Mt. Pahsien-shan, Kukuan, Taichung Hsien, Taiwan, 29–V–1971, K. KANMIYA leg. (NSMT–Ar 3273). Paratype: 1♀, Alishan, 2,160 m alt., Chiai Hsien, Taiwan, 7–III–1991, H. ONO leg. (NSMT–Ar 3292).

Description (based on ♀ holotype; variations are given in the parentheses). Measurement (in mm). Body length 3.36 (3.36–3.60); carapace length 1.42 (1.42–1.62), width 1.20 (1.20–1.25); abdomen length 2.07 (2.07–2.15), width 1.98. Length of legs of ♀ holotype as shown in Table 2.

Female. Carapace length/width 1.19 (1.19–1.29); diameter of anterior median eye/that of anterior lateral eye 0.35 (0.35–0.46); median ocular area: length/width 1.21, anterior width/posterior width 0.43 (0.43–0.46). Chelicera with 3 promarginal (Fig. 15) and 3 (3–4) retromarginal teeth. Labium length/width 0.42 (0.42–0.45); sternum length/width 1.09 (1.09–1.13). Metatarsi and tibiae of first and second legs

Table 2. Measurement of leg segments of *Diphya taiwanica* sp. nov. (in mm; ♀).

Leg	Tarsus	Metatarsus	Tibia	Patella	Femur	Total
I	0.71	1.27	1.09	0.55	1.31	4.93
II	0.66	1.11	0.95	0.53	1.27	4.52
III	0.40	0.61	0.55	0.35	0.83	2.74
IV	0.49	0.87	0.88	0.38	1.16	3.78



Figs. 14–16. *Diphya taiwanica* sp. nov. —14. Female, dorsal view (holotype, NSMT–Ar 3273). 15. Eye area and chelicerae, frontal view (holotype). 16. Epigynum (holotype). (Scales: 0.25 mm.)

prolaterally with a row of thin spines (Fig. 14), length of leg I/carapace 3.47. Abdomen length/width 1.04 (1.04–1.09). Female genitalia as shown in Fig. 16.

Male. Unknown.

Coloration and markings. Female. Carapace brown, laterally darker (Fig. 14). Legs brown. Abdomen pale yellow, laterally blackish (Fig. 14).

Range. Taiwan.

Remarks. This new species is easily distinguished from other species of the genus by the feature of epigynum. Though the male of this species is unknown, it can be said that there is no close relationship between *D. okumae* and *D. taiwanica* in the females.

Notes on the Known Species

Diphya macrophthalma NICOLET, 1849

(Figs. 17–18)

Diphya macrophthalma NICOLET, 1849, p. 406. (♀ Holotype from Valdivia, Chile, preserved in MNHN, examined; see notes. —SIMON, 1888a, p. 217.

Diphya crassipes NICOLET, 1849, p. 406. (Type specimen destroyed.)

Diphya longipes NICOLET, 1849, p. 407. (Type specimen destroyed.)

Diphya brevipes NICOLET, 1849, p. 407. (Type specimen destroyed.)

Diphya rugosa TULLGREN, 1902, p. 31, **syn. nov.** (3♀♀ Syntypes from Aysen Valley, Chile, preserved in NRS, examined.)

Specimens examined. Holotype: ♀, Valdivia, date and collector not indicated (MNHN, see notes).

Other specimens examined. 3♀♀, Aysen Valley, Chile, I-1897, P. DUSÉN leg. (syntypes of *Diphya rugosa* TULLGREN, 1902; NRS).

Notes. I could examine a female specimen collected from Valdivia preserved in MNHN (Fig. 17). The specimen has no indication as the type material. However, judging from SIMON's (1888a) statement and the data of the specimen, it is regarded as the holotype of *D. macrophthalma* NICOLET, 1849. On the other hand, I could examine the syntypes of *Diphya rugosa* TULLGREN, 1902 (Fig. 18). These specimens completely agreed with the type specimen of *D. macrophthalma* in every feature. So I considered that *D. rugosa* TULLGREN, 1902 is a junior synonym of *D. macrophthalma* NICOLET, 1849.

Diphya pumila SIMON, 1888
(Fig. 19)

Diphya pumila SIMON, 1888b, p. 226. (♂ Holotype from Madagascar, not examined.)

Specimen examined. 1♀, Madagascar, date and collector not indicated (MNHN).

Notes. I could examine one female specimen labeled *D. pumila* from Madagascar. Though the specimen is not the type material, the epigynum is illustrated for the information (Fig. 19).

Diphya limbata SIMON, 1896
(Figs. 20-21, 23-24)

Diphya limbata SIMON, 1896, p. 144. (♀ Holotype from Tierra del Fuego, preserved in MNHN, examined.)

Diphya bilineata TULLGREN, 1901, p. 216, pl. 17, fig. 3. (2♀♀ Syntypes from Tierra del Fuego and Patagonia, preserved in NRS, examined.)

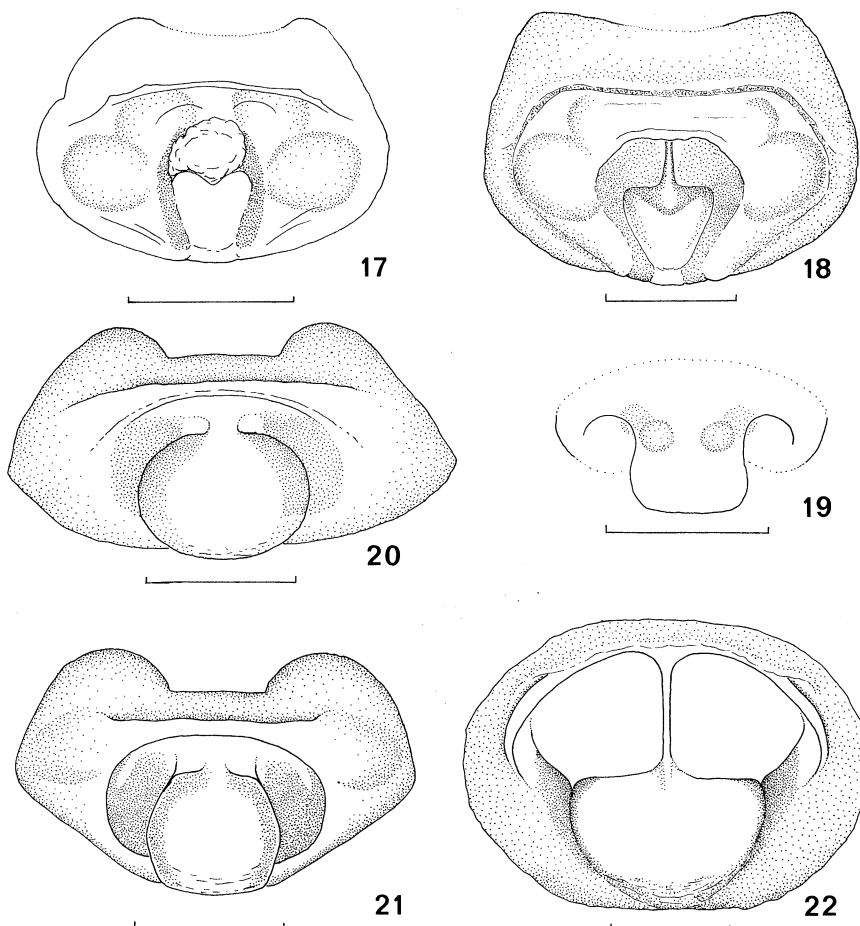
Diphya pallida TULLGREN, 1902, p. 29, pl. 3, fig. 2a-c, **syn. nov.** (1♂7♀♀ Syntypes from Aysen Valley, Chile, preserved in NRS examined.)

Diphya spinifera: WUNDERLICH, 1986, p. 219, figs. 230-231. (Nec *Diphya spinifera* TULLGREN, 1902, see notes.)

Specimens examined. Holotype: ♀, Tierra del Fuego, C. BACKHAUSEN leg. (MNHN).

Other specimens examined. 1♀, Rio Azopardo, Tierra del Fuego, I-III-1896, O. NORDENSKJÖLD leg. (1♀ from syntypes of *Diphya bilineata* TULLGREN, 1901; NRS). 1♂7♀♀, Aysen Valley, Chile, date and collector unknown (syntypes of *Diphya pallida* TULLGREN, 1902; male specimen mislabeled as *D. spinifera*; NRS). 2♀♀, Aysen Valley, Chile, I-1897, P. DUSÉN leg. (2♀♀ from syntypes of *Diphya spinifera* TULLGREN, 1902).

Notes. *Diphya bilineata* TULLGREN, 1901 was synonymized with *Diphya limbata* SIMON, 1896 by TULLGREN (1902) according to SIMON's communication. I could examine the ♀ holotype of *D. limbata* and 2♀♀ syntypes of *D. bilineata*. One of the syntypes of *D. bilineata* (from Tierra del Fuego) is exactly conspecific with *D. limbata*. But the other specimen (from Patagonia) was misidentified. The latter is

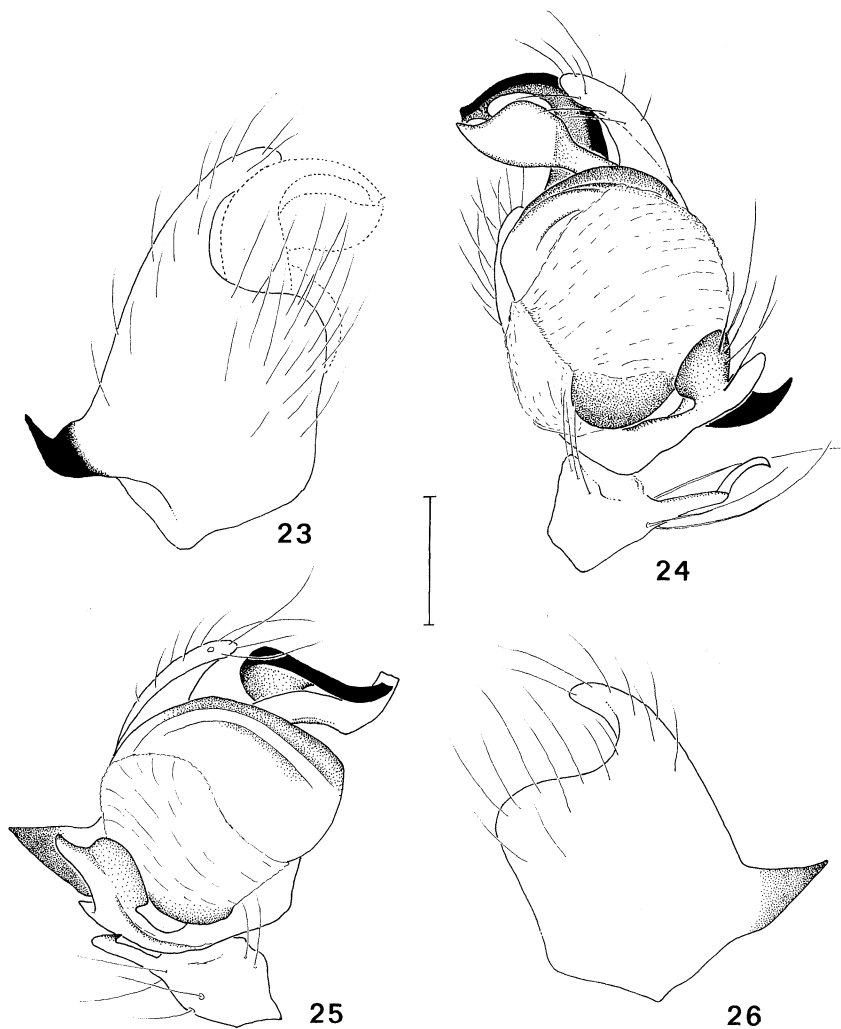


Figs. 17–22. 17–18. *Diphya macrophthalma* NICOLET, 1849.—17. Epigynum [holotype, MNHN]. 18. Epigynum [1♀ syntype of *Diphya rugosa* TULLGREN, 1902 (= *Diphya macrophthalma* NICOLET, 1849; syn. nov.), NRS]. 19. *Diphya pumila* SIMON, 1888.—19. Epigynum [the specimen from Madagascar, MNHN]. 20–21. *Diphya limbata* SIMON, 1896.—20. Epigynum [holotype, MNHN]. 21. Epigynum [1♀ syntype of *Diphya pallida* TULLGREN, 1902 (= *Diphya limbata* SIMON, 1896; syn. nov.), NRS]. 22. *Diphya spinifera* TULLGREN, 1902.—22. Epigynum, [1♀ syntype, NRS]. (Scales: 0.25 mm.)

in fact identical with *Diphya spinifera* TULLGREN, 1902. The epigynum of the specimen from Patagonia is plugged, so TULLGREN (1901) might make a mistake. Judging from his original illustration, he recognized the former specimen as *D. bilineata*. So I agree with his treatment that *D. bilineata* is a junior synonym of *D. limbata*.

In the course of the present study I could examine the syntypes 1♂7♀♀ of *Diphya pallida* TULLGREN, 1902. The female specimens (Fig. 21) are evidently identical with *D. limbata* (Fig. 20). Thus, I propose that *Diphya pallida* is a junior synonym of *D. limbata*. The male specimen in the syntypes is problematical. The

feature of its palp (Figs. 25–26) does not agree with TULLGREN's (1902) original illustration of *Diphya pallida*, but agrees with the original illustration of *Diphya spinifera* TULLGREN, 1902. On the other hand, I examined the syntypes 1♂52♀♀ of *Diphya spinifera* TULLGREN, 1902. The palpal structure of the male specimen (Figs. 23–24) exactly agrees with TULLGREN's (1902) original illustration of *Diphya pallida*. Judging from the general appearance, especially the coloration of carapace, the combination of female and male of *Diphya pallida* and *Diphya spinifera* in



Figs. 23–26. 23–24. *Diphya pallida* TULLGREN, 1902.—23. Male left palpal cymbium, dorsal view [1♂ syntype, mislabeled as *Diphya spinifera*, NRS]. 24. Male left palp, ventral view [same specimen]. 25–26. *Diphya spinifera* TULLGREN, 1902.—25. Male right palp, ventral view [1♂ syntype, mislabeled as *Diphya pallida*, NRS]. 26. Male right palpal cymbium, dorsal view [same specimen]. (Scale: 0.25 mm.)

TULLGREN's original description are correct. Thus, I came to the conclusion that these male specimens were respectively mislabeled. WUNDERLICH's (1986) illustrations were based on the mislabeled specimen. Furthermore, 52♀♀ of syntypes of *D. spinifera* include two misidentified specimens of the other species. The feature of epigynum of 2♀♀ does not agree with TULLGREN's original illustration, but agrees with that of *D. pallida* (= *D. limbata*).

Diphya spinifera TULLGREN, 1902

(Figs. 22, 25–26)

Diphya spinifera TULLGREN, 1902, p. 26. (1♂52♀♀ Syntypes from Aysen Valley, Chile, preserved in NRS, examined.)

Specimens examined. Syntypes: 1♂52♀♀, Aysen Valley, Chile, 1–1897, P. DUSÉN leg. (1♂ mislabeled as *D. pallida*, 2♀♀ misidentified; NRS).

Other specimen examined. 1♀, Ultima Esperanza, Patagonia, 4–II–1896, O. NORDENSKJÖLD leg. (1♀ from syntypes of *Diphya bilineata* TULLGREN, 1901; NRS).

Notes. As I mentioned in the notes of *D. limbata*, male specimen is mislabeled as *Diphya pallida* and two female specimens are misidentified. These females are identical with *D. limbata* SIMON, 1896.

Diphya bicolor VELLARD, 1926

Diphya bicolor VELLARD, 1926, p. 328. (♂ Holotype from Petropolis, Estado do Rio de Janeiro, Brasil, depository unknown.)

Diphya simoni KAURI, 1950

Diphya simoni KAURI, 1950, p. 71, fig. 6. (♀ Holotype from Krüger National Park, South Africa, preserved in MZLU, examined.)

Specimen examined. Holotype: 1♀, Pretorius Kop Camp, Krüger National Park, Transvaal, South Africa, 4–XI–1948, B. HANSTRÖM leg. (MZLU).

Notes. I could examine the holotype, however, its epigynum was dissected and, unfortunately, missing.

摘 要

日本産および台湾産の *Diphya* ヒメドヨウグモ属 (新称) の2新種を, *Diphya okumae* sp. nov. オオクマヒメドヨウグモ (新称) および *Diphya taiwanica* sp. nov. タイワンヒメドヨウグモ (新称) と命名して記載した. 本属のクモ類はアジアからは未記録であった. また, 本属の既知種について再検討し, *Diphya pallida* TULLGREN, 1902 を *Diphya limbata* SIMON, 1896 の, *Diphya rugosa* TULLGREN, 1902 を *Diphya macrophthalma* NICOLET, 1849 のそれぞれ新参シノニムとした.

References

BONNET, P., 1956. Bibliographia Araneorum, 2 (2), pp. 919–1926. Toulouse.

- BRIGNOLI, P. M., 1983. A Catalogue of the Araneae Described between 1940 and 1981. 755 pp. Manchester University Press, Manchester and New York.
- KAURI, H., 1950. On some South African spiders and harvestspiders. *K. fysiogr. Sallsk. Lund Forh.*, **20**: 1–16.
- NICOLET, H., 1849. Arachnidos. In GAY, C.: *Historia fisica y politica de Chile, Zoologia*, **3**, pp. 319–543. Museo de Historia Natural de Santiago.
- PICKARD-CAMBRIDGE, O., 1869. Part I of catalogue of a collection of Ceylon Araneidea lately received from Mr. J. NIETNER, with descriptions of new species and characters of a new genus. *J. Linn. Soc. London*, **10**: 373–397, pls. 11–13.
- PLATNICK, N. I., 1989. Advances in Spider Taxonomy, 1981–1987. 673 pp. Manchester University Press, Manchester and New York.
- SIMON, E., 1888a. Etudes arachnologiques. 21^e Mémoire. XXX. Descriptions de quelques Arachnides du Chili et remarques synonymiques sur quelques unes des espèces décrites par Nicolet. *Ann. Soc. ent. Fr.*, **8**: 217–222.
- 1888b. Etudes arachnologiques. 21^e Mémoire. XXXI. Descriptions d'espèces et de genres nouveaux de Madagascar et de Mayotte. *Ibid.*, **8**: 223–236.
- 1894. Histoire Naturelle des Araignées. Deuxième édition, **1**(3), pp. 489–760. Rorret, Paris.
- 1986. Arachnides recueillis à la Terre de feu par. M. Carlos BACKHAUSEN. (2^e Mémoire). *An. Mus. nac. B.-Aires*, **5**: 141–145.
- TULLGREN, A., 1901. Contribution to the knowledge of the spider fauna of the Magellan Territories. In: *Svenska Expeditionen till Magellansländerna*, **2**, pp. 181–263, pls. 15–16.
- 1902. Spiders collected in the Aysen Valley in South-Chile by Mr. P. DUSEN. *Bih. Svenska Vet. Akad. Handl.*, **28**: 1–77.
- VELLARD, J., 1926. Contribution à l'étude des Araignées. Nouvelles espèces d'Argiopidae. *Mem. Inst. Butantan*, **3**: 327–331.
- WUNDERLICH, J., 1986. Spinnenfauna gestern und heute. 283 pp. Erich Bauer Verlag bei Quelle & Meyer, Wiesbaden.